Radio Frequency Exposure Report

On Behalf of

Graupner GmbH & Co. KG.

FCC ID: **ZKZ-MC-20**

Product Description: **Computer System Graupner/SJ HoTT**

Model No.: **MC-20**

Supplementary Model: **N/A**

Prepared for: Graupner GmbH & Co. KG.

Henriettenstr. 94-96 D-73230 Kirchheim/Teck GERMANY

Prepared by: **Bontek Compliance Testing Laboratory Ltd**

1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East

Road, Nanshan, Shenzhen, China

Tel: 86-755-86337020

Fax: 86-755-86337028

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Test by: **Reviewed By:**

Vincent Jiang   _kevin chi_

Vincent Jiang   Kevin Chi

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	**Graupner GmbH & Co. KG**
Address of Applicant:	Henriettenstr. 94-96 D-73230 Kirchheim/Teck GERMANY
Manufacturer:	**SJ TECHNOLOGY(SHENZHEN) CO.,LTD**
Address of Manufacturer:	F6, 1 BLDG, A AREA, YINTIANXIFA INDUSTRIAL AREA, XIXIANG TOWN, BAOAN DISTRICT SHENZHEN, GUANGDONG PROVINCE, CHINA

General Description of E.U.T

Items	Description
EUT Description:	Computer System Graupner/SJ HoTT
Model No.:	MC-20
Trade Name:	HoTT
Supplementary Model:	N/A
Frequency Band:	2404 MHz ~ 2479 MHz
Channel Spacing:	1 MHz
Number of Channels:	75
Type of Modulation:	FHSS
Antenna Type:	Built-in Antenna
Rated Voltage:	Intput: 4.2VDC 500mA from AC/DC adapter
Adapter description:	Model: Graupner/SJ/ 33032.4 Input:100-240V~, 50/60Hz, MAX 0.5A Output: 4.2V DC/500mA

Remark: *The test data gathered are from the production sample provided by the manufacturer.*

1.2 Objective

The objective of the following report is used to demonstrate that EUT operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the relative provisions of FCC 47CFR Part 1.1307

1.3 General Description of Test

Items	Description
EUT Frequency band	☒ FHSS: 2.400GHz ~ 2.483GHz ☐ WLAN: 2.400GHz ~ 2.483GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5825GHz ☐ Others: _____
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others _____
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2) ☐ Others: _____

Antenna diversity	☒ Single antenna
	☐ Multiple antennas:
	            ☐ Tx diversity
	            ☐ Rx diversity
	            ☐ Tx/Rx diversity

Max. output power	19.65dBm (0.0923W)
Antenna gain (Max)	1 dBi (Numeric gain:10)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation
Note: *1. The maximum output power is 19.65dBm (0.0923W) at 2404MHz (with 10 numeric antenna gain.)* *2. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.*	

1.4 Human Exposure Assessment Results

Calculation

$$\text{Given} \quad E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$

Where E = Field Strength in Volts / meter
P = Power in Watts
G=Numeric antenna gain
d=Distance in meters
S=Power Density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

$P\ (mW) = P\ (W) / 1000$ and
$d\ (cm) = 100 * d\ (m)$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \qquad \textit{Equation 1}$$

Where d = distance in cm
         P = Power in mW
         G = Numeric antenna gain
         S = Power Density in mW/cm^2

EUT parameter (data from the separate report)	
Given $$E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$	Where G: numerical gain of transmitting antenna; TP: Transmitted power in watt; d: distance from the transmitting antenna in meter
Max average output power in Watt (TP)	19.65dBm (0.0923W)
Antenna gain (G)	1 dBi (Numeric gain: 10)
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)

Yields
     E =26.31V/m
     S=0.1836mW/cm^2	

Conclusion: S=0.1836mW/cm2 is significant lower than the 1mW/cm2 (For mobile or fixed location transmitters, the maximum power density is 1.0 mW / cm2 even if the calculation indicates that the power density would be larger.)	